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MONTHLY REPORT - JULY 1980

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HONOLULU LABORATORY

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PACIFIC ENVIRONMENTAL GROUP

MONTHLY REPORT - JULY 1980

STATUS OF PUBLICATIONS

Published

Hudgins, Linda L. 1980. Per capita annual utilization and consumption of fish and shellfish in Hawaii, 1970-77. Mar. Fish. Rev. 42(2): 16-20.

Leatherwood, Stephen, William F. Perrin, Vicky L. Kirby, Carl L. Hubbs, and Marilyn Dahlheim. 1980. Distribution and movements of Risso's dolphin, Grampus griseus, in the eastern North Pacific. Fishery Bulletin, U.S. 77(4): 951-963.

Records of occurrence are summarized from 22 strandings/collections and 210 sightings records from miscellaneous sources. When available, levels of effort have been identified and utilized to interpret the trends in distribution and movement apparent from the data. Risso's dolphins occur from at least the Equator (southern end of area examined) north to approximately latitude 50° N, with regions of apparently very low density centering at about latitude 20° and 43° N. Records from northern and inshore portions of the range were most numerous during late spring through early fall. Both within and among years, periods of greatest abundance for the species north of latitude 43° N, near Monterey Bay, California,

THIS REPORT DOES NOT CONSTITUTE PUBLICATION AND IS FOR INFORMATION ONLY.

and over the southern California continental borderland appear to correspond with protracted periods of warm water. Groups contained from 1 to an estimated 220 animals, about a geometric mean of 10.7. An estimated 76.4% of the groups contained fewer than 20 animals.

Approved by Center Director

Adams, P., and C. J. Ryan.
Morphology and growth of a pugheaded brown rockfish (Sebastes auriculatus).

Benville, P. E., Jr., N. D. Hirsch, and J. A. Whipple.
Benzene uptake and depuration by adult striped bass. Proceedings of Annual Meeting, Pacific Division, AAAS, University of California, Davis, June 22-27, 1980.

Evans, R. H., D. R. McLain and R. A. Bauer.
Skipjack tuna: Influences of the environment on their vulnerability to surface fishing gear in the Atlantic. For consideration for publication in Marine Fisheries Review.

Hunter, J. Roe and Roderick Leong.
The spawning energetics of female northern anchovy, Engraulis mordax. For consideration for publication in the Fishery Bulletin, U.S.

Izadore Barrett and Lillian L. Vlymen.
Laboratory Series: Southwest Fisheries Center, La Jolla. For consideration for publication in Fisheries.

Administrative Reports

Huppert, Daniel D. and Jane McMillan. Report to the Pacific Fishery Management Council on the anchovy fishery for 1979/1980. SWFC Admin. Rep. No. LJ-80-10.

Huppert, Daniel D., Alec D. MacCall and Gary D. Stauffer. A review of technical issues in the anchovy management plan. SWFC Admin. Rep. No. LJ-80-12.

Pryor, Karen and Ingrid Kang. Social behavior and school structure in pelagic porpoises (Stenella attenuata and S. longirostris) during purse seining for tuna. SWFC Admin. Rep. No. LJ-80-11C.

Yoshida, Howard O. Possible environmental impact of importing anchovy into Hawaii. SWFC Admin. Rep. No. H-80-10.

HONOLULU LABORATORY

INSULAR RESOURCES INVESTIGATION

Additional Cruises to the Northwestern Hawaiian Islands Planned

Richard N. Uchida, Leader, Insular Ecosystem Study, completed final cruise instructions for Townsend Cromwell cruise TC-80-04 (Parts I and II) and preliminary cruise instructions for cruise TC-80-05 (Parts I and II). Part I of cruise TC-80-04 (August 14 - September 6) will be devoted to a survey and quantitative assessment of various physical, chemical, and biological parameters to describe the energy flow, productivity, and mineral cycling at two representative areas in the Hawaiian Archipelago, Kawaihae, and French Frigate Shoals. This survey is part of an investigation being conducted by Dr. Jed Hirota in the University of Hawaii Sea Grant (UHSG) Program.

Part II of the cruise will be part of the Honolulu Laboratory's continuing efforts to survey and assess the demersal and pelagic marine resources of the Northwestern Hawaiian Islands (NWHI). This portion of the cruise will include field activities conducted with the FV Easy Rider, which will be under charter (October 1-16) to the Honolulu Laboratory. Easy Rider field work will include: 1) Underwater observations on the behavior of predators, such as large carangids and sharks, when sub-legal and berried spiny lobsters are released at the sea surface; 2) handline fishing in depths between 60 and 150 fathoms on an isolated submarine pinnacle or slope zone to determine the initial abundance and catchability of the resident stock of snappers, groupers, and carangids; 3) capturing and marking fishes caught at sub-surface levels; 4) night-light observations; and 5) the capture of fish for age and growth experiments to be conducted at the Kewalo Research Facility.

James H. Uchiyama, Fishery Biologist, will serve as Chief Scientist on the Easy Rider charter. He will be assisted by Reginald M. Gooding, Fishery Biologist, and Research Assistants Robert L. Humphreys, Jr. and Alan R. Everson.

Cruise TC-80-05 (Part II) will also include research on monk seals and ciguatera. Field activities in these areas of research were coordinated with those of the Insular Ecosystem by Uchida, Dr. William G. Gilmartin, Leader, Marine Mammal and Endangered Species Investigation, and Dr. Nancy Withers, Principal Investigator of UHSG ciguatera project.

Research Cruise to Northwestern Hawaiian Islands Completed

The NOAA ship Townsend Cromwell returned to Honolulu on July 29 upon completion of cruise TC-80-03. In a cooperative project with the Hawaii

Division of Fish and Game (HDFG), Chief Scientist for Part II, Bernard M. Ito and Research Assistant Darryl T. Tagami accomplished the following: a survey and assessment of monk seals at Pearl and Hermes Reef, an assessment of shrimp and bottomfish resources in the slope zones, and a survey and assessment of marine resources in zones adjacent to the shoreline at sites selected by HDFG.

Otolith Research and Other Duties Continue

J. Uchiyama began the examination of otoliths from skipjack tuna, Katsuwonus pelamis, opakapaka, Pristipomoides filamentosus, and several carangids which had been marked with oxytetracycline. Because of the early deaths of these fish after marking, preliminary examinations indicate that countable growth increments may not be detectable. A more detailed scrutiny of otolith sections will be made to determine whether or not the growth increments are detectable. Using another sample of marked opakapaka which survived for 40 days after oxytetracycline treatment, Uchiyama and Stephen V. D. Ralston, an investigator with UHSG, were able to identify the growth increments.

* * * * * * * * * *

Dr. Jeffrey J. Polovina, Statistician, began a paper, "Comparative studies on fish yields from various tropical ecosystems," in collaboration with Dr. Gerald Martens, Research Associate, East-West Environment and Policy Institute of the University of Hawaii. Polovina continued his studies on the NWHI bulk biomass ecosystem model and began analyses of data on kahala, Seriola dumerili, sampled for ciguatoxin at the fish auction since April 1979.

* * * * * * * * * *

Dr. Bruce Phillips, Scientific Assistant to the Chief, Commonwealth Scientific and Industrial Research Organization (CSIRO) of Australia, arrived on July 19 to work with personnel of the Insular Ecosystem Study on spiny lobster research.

* * * * * * * * * *

Research Assistants Paul M. Shiota, Victor A. Honda, Bert S. Kikkawa, and James L. Prescott began fabrication of gear for cruises of TC-80-04 and Easy Rider.

Shiota revised a manuscript co-authored with Uchida entitled "Current status of fisheries in the Hawaiian Islands."

* * * * * * * * * *

Kikkawa and Prescott, in support of Drs. Michael Laurs and Gary Sakagawa of the La Jolla Laboratory, collected fishing logbooks and sampled albacore tuna, Thunnus alalunga, from trollers who fished in central North Pacific albacore grounds and unloaded in Honolulu.

PELAGIC RESOURCES INVESTIGATION

Stress Triggers Skipjack Tuna Spawning

Skipjack biopsies taken the day after capture showed that skipjack tuna delivered to the Kewalo Research Facility had very recently spawned and, after several occasions, Dr. Calvin Kaya of Montana State University made the breakthrough deduction that spawning was induced by some stress factor(s) related to the capture and delivery process. Painstaking observations showed that skipjack tuna ovulated within 7 to 8 hours after capture. Because of this discovery, it was possible to strip running ripe females of ova at the appropriate time for artificial fertilization. Thus, deliveries of live skipjack tuna on July 15, 21, 22 and 31 have resulted in about 1 million fertilized ova.

Dr. Kaya obtained strong support for his hypothesis which states that stress triggered final maturation, by examining egg diameter of fish killed immediately after capture and of fish permitted to live. In every case, ova from the dead fish measured no more than 0.6 mm in diameter compared to the 1.0 mm diameter of ripe eggs spawned by the specimens kept alive.

Skipjack Tuna Larvae Survive to 12 Days

Under the supervision of Research Assistant Thomas K. Kazama, Research Assistants Sharon D. Hendrix and Linda A. Barraclough have reared the skipjack larvae past the critical stage when the yolk sac is completely absorbed and the young animals must start feeding. The critical stage occurs on the 3d day after hatching and the skipjack tuna larvae have been kept alive for 12 days. There seems to be another critical period of 12 days, however, because none of the larvae have lived past 12 days.

Green Sea Turtles Nesting Behavior Studied

Radio-tracking studies using four male and four female green sea turtles were conducted at French Frigate Shoals over a 21-day period during June. The turtles stayed mostly within a 1 n mi radius of the island (Whale-Skate or Trig) on which they were affixed with beacon transmitters. The greatest distance recorded was approximately 2.5 n mi. The frequency of basking, nesting, and surfacing intervals was recorded and these data are currently being analyzed. One of the females equipped with a transmitter on Trig remained in that island's adjacent waters during the internesting interval, but repeatedly traveled to Tern for nesting purposes. Collaborators in this study are Drs. Andrew E. Dizon, George H. Balazs and G. Causey Whittow of the University of Hawaii, Lt. Howard A. Jemison, NOAA Corps, and Research Assistant Steven H. Kramer.

Cooperative Squid Research Arranged with the University of Hokkaido

Tamio Otsu, Chief, Pelagic Resources Investigation, and Walter M. Matsumoto, Fishery Biologist, worked on arrangements to begin a 3-year cooperative squid survey and assessment project with the University of Hokkaido. The University will be using their training ship Hokusei Maru (893 tons) as the principal research platform, to conduct squid surveys in the Hawaiian Islands and along the NWHI. The eminent squid biologist, Dr. Tsuneyoshi Suzuki, will serve as Chief Scientist for the University of Hokkaido. Matsumoto will serve as his U.S. counterpart.

The UHSG Program may be interested in participating in this joint research project, which is expected to begin the first cruise in January 1981.

Japanese Longline Data of Area Around Hawaiian Islands Plotted

During July, Nancy Green, an NMFS Junior Fellow, completed a series of monthly plots of Japanese tuna longline catch and effort statistics by 1° square around the Hawaiian Islands. Green's work, supervised by Marian Y. Y. Yong, will be incorporated in the Fishery Management Plan for billfishes in the western Pacific region.

FISHERY MANAGEMENT PROGRAM

Skipjack Tuna Landings Continue Below Long-term Average

The Hawaii landings of skipjack tuna during July 1980 were estimated at 359.91 metric tons (MT), which is 240.79 MT below the landings for the same period in 1979, and 321.09 MT below the 1948-79 long-term average for the same period. The cumulative landings from January through July were estimated at 1,297.2 MT, which is 492.7 MT below last year's landings for the same period and 916.6 MT below the 1948-79 long-term average for the same period.

DATA MANAGEMENT AND TECHNICAL SERVICES (DMTS)

Laboratory Computer Requirements Studies Continue

George W. T. Liao, Operations Research Analyst, reported that Stuart Hill, a consultant with Systems Architects, Inc. (SAI), visited the Honolulu Laboratory to review the Laboratory's usage of the University of Hawaii computer facilities. Personnel in Data Management and Technical Services executed two benchmark programs in the University's system, which

Hill will compare with the various computer systems used at the La Jolla Laboratory. This exercise is part of the SWFC computer requirement study required by NOAA.

Fishery Information Network Meeting Held

G. Liao and Fred Kellenberger, SWFC Data Systems Manager, met with Henry Sakuda, Margo Stahl, and others at the HDFG to discuss the Fishery Information Network (FIN) project for Hawaii. The meeting outlined the various steps that will be taken in a 9 to 10 month systems study to be conducted by HDFG and the mechanism for reporting progress and billing charges.

Introductory Class on System 1022 Data Management

During the week of July 7, Paul D. Renard conducted a class on data management techniques in the System 1022. The class was well attended by most members of DMTS and personnel from other tasks and offices.

* * * * * * * * * *

Ray F. Sumida, Fishery Biologist, reviewed a draft report on the National Foreign Fishing Vessel Observer Program (FFVOP) for Mary DiGuilian (Fx54). He also reviewed a draft report prepared by Dr. R. Nagler on satellite communications requirements of the FFVOP.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

Coastal Division Scientist Provides Instruction for INP Group in Mexico

As part of the cooperative effort in training between the Instituto Nacional de Pesca and the Southwest Fisheries Center, Dr. Geoffrey Moser provided a one-week training course in Mexico City for selected scientists of the INP Ichthyoplankton group. The sponsor of this training was Sea Grant's International Cooperation Assistance Program (ICAP) of the Scripps Institution of Oceanography. ICAP is directed by George T. Hemingway of SIO.

Results of Ultraviolet Light Effects on Anchovy Larvae Discussed at Copenhagen Meeting

Dr. John Hunter attended a meeting in Copenhagen, Denmark in late July where he discussed his recent results on the effect of ultraviolet light on survival of anchovy larvae.

Uncertainties in estimating the UV dose for northern anchovy larvae, Engraulis mordax, include the action spectrum used and relative sensitivity of life stages. A preliminary estimate of UV induced losses to larval anchovy standing stock was made by Hunter, Sandor Kaupp and Dr. John Taylor. This calculation took into account seasonal changes in larval abundance, UV radiation and average cloud cover, vertical distribution, and penetration of UV radiation into the habitat. Present evidence indicates that anchovy and other larval fish populations may be under some UV stress today but predicted levels of ozone diminution will probably not have a major effect on larval populations.

A paper describing photorepair, i.e., the ability of UV damaged anchovy larvae to be repaired by white light, has been completed by Hunter Hunter and Kaupp. They showed that there is at least 10X more white light available in the sea than is needed to maximize photorepair.

Center Staff Attend CalCOFI Retreat

Drs. Lasker and Barrett attended a CalCOFI retreat in Pine Valley, California, to discuss future directions of CalCOFI with the other participants in the program, SIO and the California Department of Fish and Game.

Satellite Studies and Anchovy Distribution Manuscript Completed

Dr. R. Lasker, Dr. M. Laurs, and SIO student Jose Pelaez completed a manuscript this month entitled "The Use of Satellite Infrared Imagery for Describing Ocean Processes in Relation to Spawning of the Northern Anchovy (Engraulis mordax)."

Using satellite infrared thermal imagery in conjunction with extensive sampling for anchovy eggs and adults during March and April 1980, they were able to confirm that large areas of the coastal ocean off California were avoided by anchovies during the peak of spawning due to entrainment into the California Current of cold ($\leq$ 14° C) upwelled water produced north of Point Conception. Upwelling began coincident with southward winds and proceeded in pulses separated by a few days. Plumes appeared to be carried southward in ladder-like rows by the California Current. A saline 50+m deep warm water pool, 40 km off Ensenada, Baja California also was avoided by anchovies. The production of an inshore 16° C refuge and an extensive 220 km warm water wake by Santa Catalina Island was observed and photographed. Each of these unusual oceanographic features seen by satellite was confirmed by ship observations.

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH

1980 Anchovy Biomass Estimated at Slightly Less Than One Million Tons

In July, Dr. Gary Stauffer and Statistician Susan Picquelle reported a 1980 anchovy biomass estimate of 924,000 short tons, derived by egg production method using the egg/trawl data collected during the March and April Jordan cruises. A second estimate of spawning biomass was calculated from larval fish data collected during the 1980 CalCOFI survey. These data were collected over the months of February through May from four cruises: Soviet 8003-TIC (the Soviet research vessel Tikhookenanskiy), Jordan 8003-JD, 8004-JD and 8005-JD. These cruises covered about half of the usual seasonal and areal survey pattern planned in the summer of 1979. The 1980 larva samples which were collected and sorted were summarized for the southern California Bight and northern Baja for the second half of the winter quarter, and for the southern California Bight only for the spring quarter. The historical CalCOFI anchovy data was compiled to match the coverage of the 1980 egg and larva data.

The 1980 partial larva census, Lm, was expanded to an equivalent annual larva census (La) using regression of (La-Lm) on Lm for the CalCOFI years in which there were sufficient data. The resulting estimate of 1980 larva census was $18{,}110 \times 10^{9}$ larvae. This converts to a biomass of 1,775,000 short tons using Smith's equation $B = 9.8 \times 10^{-8} \cdot La$. Because of the small sample size available from the truncated survey pattern, this larva census-based biomass estimate is undesirably imprecise.

Both estimates of anchovy spawning biomass were presented in detail to the Scientific and Statistical Committee (SSC), Anchovy and Jack Mackerel Advisory Subpanel, and the Pacific Fishery Management Council. The SSC concluded that the egg production estimate was the best estimate of the absolute size of the stock. However, for the purpose of setting the 1980-81 quota, both the Council and the SSC recommended that the SWR use the higher number. They based this recommendation on their conclusion that the 1980 biomass has probably not changed much from the 1979 biomass, as shown by the results of the Center's larva census estimate and the sonar survey conducted by California Department of Fish and Game. The harvest quota formula in the anchovy FMP was based on the historical larva census estimates.

Picquelle reviewed the estimation procedure of the 1980 northern anchovy spawning biomass based on the 8003 egg and trawl survey of the central subpopulation. The new data was organized into several data files which were catalogued for future reference. The actual calculations of the individual parameter estimates (e.g., spawning fraction, fecundity, etc.) were verified and documented.

These same parameters were then re-estimated using only the data from the last half of the 8004 cruise (April 20-28). This portion of the cruise covered the Los Angeles Bight area (CalCOFI regions 7 and 8) and included a few samples off Mexico (CalCOFI region 11), thus covering approximately the same area as the 8003 cruise but with much poorer coverage off Mexico. The number of CalVET samples for 8004 is about one-half the number for 8003, and the number of positive trawls is about one-third the number for 8003.

The 8004 cruise occurred toward the end of the spawning season and it was suspected that many females had stopped spawning for the year. To test this hypothesis the parameter estimates using the 8004 data were compared with the corresponding estimates from the 8003 data, using the t-tests for the difference between two means. It was concluded that egg production and spawning fraction were significantly lower during the 8004 cruise than the 8003 cruise, which supported the hypothesized decline in spawning activity. Sex ratio, average female weight and fecundity did not change significantly from March to April.

The value of the biomass estimate based on the 8004 cruise is 183,000 short tons. This estimate was adjusted to make the area coverage in the 8004 cruise equivalent to that of the 8003 cruise, giving a final estimate of 329,500 short tons. The small sample size for CalVET samples and trawls during 8004 led to an extreme lack of precision about this estimate, with a standard deviation of 253,900 and coefficient of variation of 77%. Because of this lack of precision, it was not possible to detect a significant difference between the 8003 biomass estimate of 924,100 short tons and the adjusted 8004 biomass estimate of 329,500 short tons.

Developments May Result in Future Revision of FMP

Although the SSC, Council and NMFS representatives agreed that the anchovy Fishery Management Plan (FMP) needed no further modifications this year, it became apparent that a thorough revision of the plan may be needed next year. Two reasons for the revisions are 1) a switch to the egg production method from the larva census method of estimating anchovy population will require a re-scaling of the historical stock size estimates and a re-analysis of the yield model; and 2) the concept of a logistic type density-dependent population model for northern anchovy continues to draw fire from some SSC members, and is being seriously reconsidered by the FMP Development Team.

An alternate recruitment model suggested at the July 7-8 SSC meeting in La Jolla has a constant per capita recruitment up to a critical spawning stock size, and then a constant absolute recruitment level at larger

stock sizes. Specifically, annual recruitment, R_t, is

$$R_t = \begin{cases} 1{,}527{,}000 & B_{t-1} > 1.2 \times 10^6 \text{ tons} \\ 1.247 \times B_{t-1} & B_{t-1} \leq 1.2 \times 10^6 \text{ tons} \end{cases}$$

Under this alternative recruitment model, the potential average catch increases to close to 1 million tons in contrast to the 480 thousand tons estimated using the logistic model. These and other results are explained in SWFC Administrative Report LJ-80-12.

Partyboat Passenger Survey Contract Completed

Dr. D. Huppert, Investigation Leader, received the final report from Al Jongri of Center for Natural Areas on July 30. As related in SWFC's May report, the contractor estimated the demand for partyboat trips via the travel cost method. Individual demand curves were estimated for each of four regions (San Diego, Los Angeles, Santa Barbara, and San Francisco), two seasons (summer or winter), two times a week (weekday or weekend), and two types of fishing (surface or bottom fish). The dependent variable is per capita participation rate in distance zones around each site. Dependent variables include cost of traveling to a partyboat site plus other costs of fishing, per capita income, expected fish catch, and angler's investment in fishing gear.

Differences in estimated demand equations for weekday and weekend trips were judged to be statistically insignificant. The division of the data by seasons and target species was found to be significant based on a test for structural homogeneity. Also, the division of the data into regions is apparently necessary. Given the four seasons, two seasons, and two target species groups, there are sixteen demand equation estimates. In all but one of these equations the travel cost variable entered with a negative sign, as it should, and was statistically significant at the 95% level by the one-tailed t-test. Since this negative slope is the main implicaton of the recreational demand model, the development of site-specific travel-cost model can be considered a success.

Other important questions addressed by this research concern the independent effects of expected catch, income level, and investments in fishing gear on the demand for partyboat fishing trips. The income variable proved to be significant in only six of the sixteen subclasses; these six cases were those which "fit" the data best (i.e., had the highest R^2's). Investment in fishing gear passed the one-tailed t-test for significance at the 90% or above level in only three cases. Most disappointing, however, was the failure of the fish catch expectation to yield a significant repression coefficient in eleven of the equations.

One of the drawbacks of the travel-cost method of analysis is that data taken from survey forms must be summarized by distance zone. For instance, the 286 valid responses for surface summer fishing in the San Diego region were grouped into 14 distance zones. The per capita participation rate, average per capita income, average catch expectation, average gear investment and travel cost for each zone become the data for

a regression analysis. Clearly, 14 points provide very few degrees of freedom, and the averaging of the other independent variables besides travel cost for each zone may mask any variability in these "shift" variables (unless the other factors are colinear with distance).

The data set developed for this survey is one of the most comprehensive of its kind available in the United States. Additional analyses will focus on variations to the standard travel-cost model and upon other models, such as the willingness-to-pay approach and the discrete choice models being investigated by Cynthia Thomson. An SWFC Administrative Report on the contract results will be issued soon.

Population Estimates Completed for Rockfish Larvae for Selected Areas and Years

John MacGregor, Fishery Biologist, has compiled the following summary data for rockfish larvae from CalCOFI samples:

Population estimates for numbers of rockfish larvae in the area represented by CalCOFI lines 60 through 137 have been completed for the years 1950 through 1959 plus 1966, 1969, 1972 and 1975. These estimates represent the numbers of larvae present in the area at the time of sampling for 12 (monthly) cruises each year.

The mean annual estimate for number of larvae present was 135×10^{12}. The estimate for 1959 was unusually small, 38×10^{12}. The remaining 13 estimates ranged from 82×10^{12} (1950) to 210×10^{12} (1957).

The distribution of larvae by area was:

Lines 60-77	(6 lines)	44.6%
80-93	(5 lines)	38.2%
97-107	(4 lines)	7.0%
110-120	(4 lines)	7.1%
123-137	(5 lines)	3.1%

The % distribution of larvae by month was:

Jan.	17.9	July	3.4
Feb.	31.4	Aug.	1.8
Mar.	16.8	Sep.	0.9
Apr.	12.0	Oct.	1.3
May	5.7	Nov.	1.4
June	4.6	Dec.	2.8

The monthly distribution of spawning seemed to remain more nearly constant from year to year than for many other species of fishes. Also, heavy spawning in January tended to be followed by heavy spawning in February and March, and light spawning in January, followed by light spawning in the following months.

The following table gives the correlation coefficients for estimated numbers of larvae for various pairs of months (N = 11 to 14 years).

	Jan	Feb	Mar	Apr	May
Feb	.78				
Mar	.63	.76			
Apr	.57	.38	.27		
May	.44	.22	.26	.69	
June	.15	.22	.38	.72	.67
July				.30	.19

Probabilities for Jan.-Feb.-Mar. correlations are roughly .01 or better. The same is true for the April, May and June group which may represent late spawning rockfish of the subgenus Sebastomus.

Oceanic Fisheries Resources Division

TUNA AND BILLFISH RESOURCES PROGRAM

Fifth North Pacific Albacore Workshop Held at La Jolla Laboratory

The Fifth North Pacific Albacore Workshop was held in La Jolla on June 30 through July 3, 1980. Participants included scientists from Canada, Japan, Taiwan, California, Oregon, Washington, and the Southwest Fisheries Center.

The workshop, chaired by Dr. Norm Bartoo, Fishery Biologist, focused on 1) a mutual exchange of fishery data and statistics; 2) current status of North Pacific albacore stocks; 3) current research on North Pacific albacore stocks; 4) the structure and potential usefulness of a simulation model for albacore management; 5) oceanographic processes affecting albacore migration and distribution and how these processes might be quantified for inclusion in a management simulation model.

Document on Estimated Yield-per-Recruit of North Pacific Albacore Workshop

Dr. Norman Bartoo, Fishery Biologist at the La Jolla Laboratory, presented a working document on "Estimated Yield-per-Recruit of North Pacific Albacore (Thunnus alalunga)" at the Fifth North Pacific Albacore Workshop held at the La Jolla Laboratory, June 30 to July 3, 1980. The analysis presented estimated historical age structures of the catch, age specific fishing mortality rates and yield-per-recruit realized by the fishery. The paper discusses changes in 1970's. Results indicate that the estimated yield-per-recruit to the overall fishery has declined slightly since 1971.

Scientists attending the Fifth North Pacific Albacore Workshop (from left to right): Keith Ketchen, Fisheries Environment Canada; Larry Hreha, Oregon Dept. of Fish & Game; Mark Pederson, Washington Dept. of Fisheries; Fred Hagerman, Calif. Dept. of Fish & Game; Wes Parks, SWFC, La Jolla; Sam Bledsoe, Univ. of Washington; Ron Lynn, SWFC, La Jolla; Jerry Wetherall, SWFC, Honolulu; Mike Laurs, SWFC, La Jolla; Earl Weber, SWFC, La Jolla; Misao Honma, Susume Kume and Ichiro Yamanaka, Far Seas Fisheries Research Laboratory, Shimizu, Japan; R. T. Yang, Taiwan University, Norman Bartoo (Workshop Chairman), SWFC, La Jolla and (not pictured) Gary Sakagawa, SWFC, La Jolla.

Center Scientists Participate in Intersessional ICCAT Meetings

Dr. Gary Sakagawa, Chief, Oceanic Fisheries Resources Division, and Wes Parks, Tuna/Billfish Resources Program Leader, recently participated in two International Commission for the Conservation of Atlantic Tuna (ICCAT) intersessional meetings. The meetings, held at Brest, France between May 28 and June 7, 1980, were hosted by the Centre Oceanologique de Bretagne.

The first meeting was that of ICCAT's Juvenile Tuna Working Group, which addressed problems associated with catches of juvenile tunas. Meeting participants reviewed fishery and biological data on yellowfin, bigeye and skipjack tunas, conducted yield-per-recruit analyses on bigeye and yellowfin and identified time/areas in which large catches of juvenile tuna occur. Results indicate that large catches of juvenile bigeye and yellowfin in the Gulf of Guinea are coincident in time and space with large catches of skipjack. A report summarizing meeting results is being prepared by the ICCAT Secretariat.

The second meeting, a meeting of ICCAT's Subcommittee on Skipjack, addressed research projects for ICCAT's International Skipjack Year (ISY) Program. All ISY projects were found to be progressing smoothly with participants optimistic that activities in 1981 would be successful. A report of this meeting is also being prepared by the Secretariat.

Final 1979 Fishery Statistics for U.S. Tropical Atlantic Tuna Purse Seine Fishery

Al Coan, Mathematician, and Robert Nydam, Computer Programmer, have compiled final statistics for total catch and sample catch, effort and length-frequency for the 1979 U.S. tropical Atlantic tuna purse seine fishery. These data, compiled as part of the U.S. commitment to the International Commission for the Conservation of Atlantic Tunas (ICCAT), were forwarded to ICCAT on July 14, 1980.

Coan and Nydam's data indicate that in 1979, nine U.S. purse seiners participated in the Atlantic tuna fishery. Catches by these vessels included 3,167 MT of yellowfin tuna, 2,810 MT of skipjack tuna, 212 MT of bigeye tuna and 14 MT of miscellaneous species. Eighty-eight percent of their catch and 84% of the effort by these vessels was centered in the Gulf of Guinea off West Africa. A total of 1,752 fish from the catches of these vessels were measured for fork length. Analysis of these length measurements show the bigeye and yellowfin tuna catches were dominated by fish greater than 80 cm. in length. Again, as in 1978, large skipjack, > 80 cm, were recorded in western Atlantic catches.

Size-composition data from foreign vessels that trans-ship their catches to Puerto Rico were also submitted to ICCAT. Over 9,000 yellowfin, skipjack, bigeye and albacore tunas from these catches were measured by Eugene Holzapfel, Biological Technician, for fork length. Analysis of these samples indicate that more than 70% of the yellowfin and bigeye catch is composed of fish less than 50 cm in length.

Specifications Completed for Environmental Product Evaluation Data Base

Dick Evans, Physical Oceanographer, and Al Coan, Mathematician, have completed the design of a data base to be used to archive and access product evaluation information associated with environmental products disseminated via the SEASAT-A Data Distribution System (SDDS).

As co-principal investigator on a contract with NASA/JPL, Evans is currently conducting an evaluation of the utility of specialized environmental products to tropical tuna fishermen. The products, prepared by the U.S. Navy's Fleet Numerical Oceanography Center, Monterey, are transmitted daily through the SDDS and the Center's radio station, WWD, to 11 purse seiners who are evaluating their content. The evaluation comments of the fishermen will be collected at the end of each trip and entered onto the new data base. This accumulated data will form the basis of a final contract report due in October.

The data base formats designed by Evans and Coan have been made available to a number of other NASA/JPL contractors.

Gardiner Foundation Awards Presented to Top Billfish Tagging Boats

Jim Squire, Fishery Biologist, traveled to Rancho Buena Vista, S.A. (near the tip of Baja California, Mexico) on July 13, 1980 to present the 1979 Gardiner Foundation Awards. The Foundation, established by the late Tom Gardiner, a well-known angler and recreational fishing organization leader, presents awards to Mexican sportfishing captains who tag and release the most billfish each year. Award determinations are made by tallying the tag cards received at the SWFC from each sportfishing boat. This year's (1979) awards went to the six top skippers with Jesus Araiza, winner of many previous awards, taking top honors, a plaque and $100.00. Other winners for 1979 were:

Captain Antonio Vargas	2d place	$80.00
Captain Francisco Loredo	3d place	$60.00
Captain Gilberto Castro	4th place	$40.00
Captain Filomeno Lucero	5th place	$40.00
Captain Jose Ortez	6th place	$40.00

The Gardiner Foundation also presents a plaque to the fishing resort that tags the most billfish. Hotel Rancho Buena Vista won, as they have every year since the program began in 1970.

Tuna Vessel Participation in FAX Advisory Program

During June 1980, 23 tuna seiners contributed synoptic weather data to the NMFS FAX Advisory Program. A total of 166 weather observations were reported via NMFS-licensed radio station WWD. The table below summarizes program participation during June 1979 and 1980.

	1979	1980
Number of vessels with equipment	46	45
Number of vessels reporting	15	23
Number of weather observations reported	54	166
Number of XBT observations reported	9	0
Total observations	63	166

Leading all program participants in June were the captains and crews of the tuna seiners Jo Ann and Mary Lucille. We wish to thank these and all other contributors.

MARINE MAMMAL ASSESSMENT AND MONITORING PROGRAM

Development of Analysis Programs to Estimate Porpoise Mortality Nears Completion

The development of analysis programs to estimate porpoise mortality is near completion. The methods were developed and procedures have been implemented satisfactorily in the past three years. The personnel involved in this task, Dr. Nancy Lo and Bruce Wahlen, have been given other assignments.

Two Soviet Marine Mammologists Participate in Jordan Research Cruise

Two Soviet marine mammalogists, Drs. Valery Mineev and Alfred Berzin, participated in a 25-day coastal marine mammal cruise aboard the David Starr Jordan that ended July 11, 1980. During the cruise the scientists made sightings of blue whales off California, which they noted were the pygmy subspecies of the blue whale (Balaenoptera muscalus). This subspecies has not been reported previously off California. The scientists plan to work with Fishery Biologist Dr. David Au, of the La Jolla Laboratory, in analyzing data collected during the cruise.

The participation of the Soviet scientists in this cruise is part of an NMFS program of exchanging scientific information concerning marine mammals between the U.S.S.R. and the U.S.A. The main purpose of the Soviet scientists' visit was to learn more about survey and analytical techniques used by scientists at the La Jolla Laboratory. Next year, Drs. T. Smith and R. Holt plan to visit Soviet laboratories to learn more about Soviet assessment techniques for small cetaceans.

MARINE MAMMAL BIOLOGY AND TECHNOLOGY PROGRAM

Enamel Layers in Dolphin Teeth May Help Scientists To Estimate Gestation Periods

Dr. Al Myrick reports the beginning of a project to assess the time significance of enamel layers in dolphin teeth in an effort to estimate gestation periods. Fetuses of Stenella spp. begin to accumulate enamel layers at about 25-28 cm in body length and the number of layers increase as the fetus grows. Several hundred-plus layers occur in the enamel of newborns, juveniles, and adults. If, as is suspected, these layers represent daily records of growth, up to 8 months of gestation period can be accounted for using enamel-layer counts.

Dr. Myrick and Dr. L. H. Cornell of Sea World, Inc., have collaborated to label tooth-enamel of fetuses in utero by administering oral doses of tetracycline to pregnant bottlenose dolphins. The drug will be imparted

to the fetuses through the female's circulatory system and should label the formative enamel layers in the developing fetal teeth. After the dolphins have been born, scientists hope to find tetracycline labels in the enamel (and prenatal dentine) which will be evaluated in terms of the elapsed gestation time between the labeling dates and the dates of birth.

If prenatal layers are found to represent reliable time units, partial gestation periods and fetal growth rates can be determined directly for spinner and spotted dolphins associated with the yellowfin tuna fishery of the eastern tropical Pacific. In anticipation of this, Curt Allan, a summer REGIE student working for Myrick, is preparing a developmental series of teeth taken from fetuses and neonates of those stocks.

Supplementary studies using developmental data from captive dolphins and domestic terrestrial mammals will be conducted to determine that portion of the gestation period in wild dolphin populations not recorded in the prenatal tissues of the teeth.

Tooth Layering Rate Project on Hawaiian Spinner Dolphins Progresses

Dr. A. Myrick traveled to Sea Life Park, Makapuu Pt., Hawaii, to oversee and document the tooth extractions and tetracycline injections of three Hawaiian spinner dolphins held there. The extracted teeth will contain a marked record of the first 6 months of a one-year-long monitoring of layer accumulation rates in teeth for this species. Results of the experiment will be used to time-calibrate dental layers in the teeth of wild animals of the genus Stenella from the eastern tropical Pacific, permiting Myrick to furnish real-age data for the specimens he is now analyzing.

Galleys Received for Age Determination Conference and Workshop Papers

Galley proofs of conference papers and workshop report of the International Conference on Determining Age of Odontocete Cetaceans, held in La Jolla in September 1978, were received by Drs. W. F. Perrin and A. C. Myrick, editors of the Proceedings. The Proceedings will be published by the International Whaling Commission as a single, hard-cover volume entitled Age Determination of Toothed cetaceans and Sirenians/ The volume contains 17 papers and a comprehensive description of the results and recommendations of the 10-day workshop, including an extensive catalogue of laboratory techniques for preparation and reading of odontocete and sirenian teeth and bones. Proofreading of the copy and indexing of the workshop report are in the final stages. The volume is expected to be available late this year.

Stranded Marine Mammal Hot Line Initiated - Poster Distributed

For the first time, persons encountering a beached marine mammal in San Diego County have a single 24-hour phone number to notify scientists interested in obtaining specimens or rehabilitating the animal. The

phone line (714-234-1991) was established by the Marine Mammal Salvage Project and is staffed by the California Department of Fish and Game. Persons calling the hot line are queried as to the type of animal (whale, dolphin or seal), the condition of the animal (alive or dead), and the location of the stranding. The "operator" then notifies the appropriate scientific institution(s) agreeing to respond to strandings. At present, Sea World is notified of all live strandings, while SWFC responds to dead strandings, though several other institutions are "back-ups" when the primary respondents cannot send personnel to the stranding.

In conjunction with the establishment of the phone line, an "information wanted" poster has been distributed to all lifeguards and beach patrol agencies and posted in San Diego County.

Cooperative Marine Mammal Salvage Program

WHALES, DOLPHINS and SEALS

Call: Marine Mammal Salvage Program – 24 Hours
714·234·1991

COORDINATED BY THE U S NATIONAL MARINE FISHERIES SERVICE IN COOPERATION WITH SEA WORLD, CALIFORNIA DEPARTMENT OF FISH & GAME, NAVAL OCEAN SYSTEMS CENTER, HUBBS-SEA WORLD RESEARCH INSTITUTE, SCRIPPS INSTITUTE OF OCEANOGRAPHY, & AUTONOMOUS UNIVERSITY OF BAJA CALIFORNIA

Carcasses recovered under this program will be examined to assess parasitism and naturally occurring diseases of marine mammals, and to document traumatic injuries possibly caused by interactions with fishing gear.

Mammal and Tracking Project Continues

Jacqueline Jennings, in charge of the project to track marine mammals, reports that major emphasis during July was on processing and analyzing dolphin surfacing data obtained from precision photographic radiotelemetric equipment. In June, a Hawaiian spotted dolphin was instrumented with two continually transmitting VHF transmitters packaged in the satellite transmitter housing, i.e., one tube on either side of the dorsal fin. The dolphin was photographed from a vessel with both high speed (400 frames per sec) and normal speed (32 frames per sec) movie cameras. The lengths of the transmissions were recorded on magnetic tape from an airplane during filming and also on days when the dolphin was "undisturbed."

Analysis of the film revealed that, while total surfacing times exceeded the amount of time required for transmission of a NIMBUS-6 message (980 msec), the antenna was not totally exposed and free of splashes for the initial 200-300 msec. There usually was a second splash of shorter duration when the animal began to submerge, reducing the available transmission time to about 500-600 msec.

Analysis of 483 recorded radio transmissions are presented in Table 1. Seventy percent of all surfacings were equal to or greater than 1000 msec with 40% between 1000-1250 msec. Further analysis indicated that signals are approximately evenly distributed between 1000-1125 msec and 1125-1250 msec. Allowing about 500 msec for time lost in exposing the antenna and cleaning it of the splashes plus 980 msec for the transmission, about 1480 msec are needed. Approximately 9% of the surfacings lasted at least 1500 msec, so enough hits might get through to the satellite with minor antenna modification.

Modification of the antenna by placing it on a pedestal, thereby extending it beyond the splash zone, will be tested as soon as possible to determine whether enough time can be gained to warrant pursuing a NIMBUS-6 satellite for dolphin tracking system, and to decide whether to convert to the TIROS system which requires only a 300 msec signal.

Serum Chemistry Studies of Dolphin Blood Continue

Thomas Shay, Biological Technician, is analyzing serum chemistry and hematology data from captive Hawaiian spinner dolphins. Two of the 5 dolphins sampled died during the last 6 weeks of the 6-month sampling period. Early statistical tests of differences between the animals that survived and those that died suggest that increased variation among several blood parameters may be significant indicators of the animals' health. Dr. Nancy Lo, Biostatistician, is cooperating in this analysis.

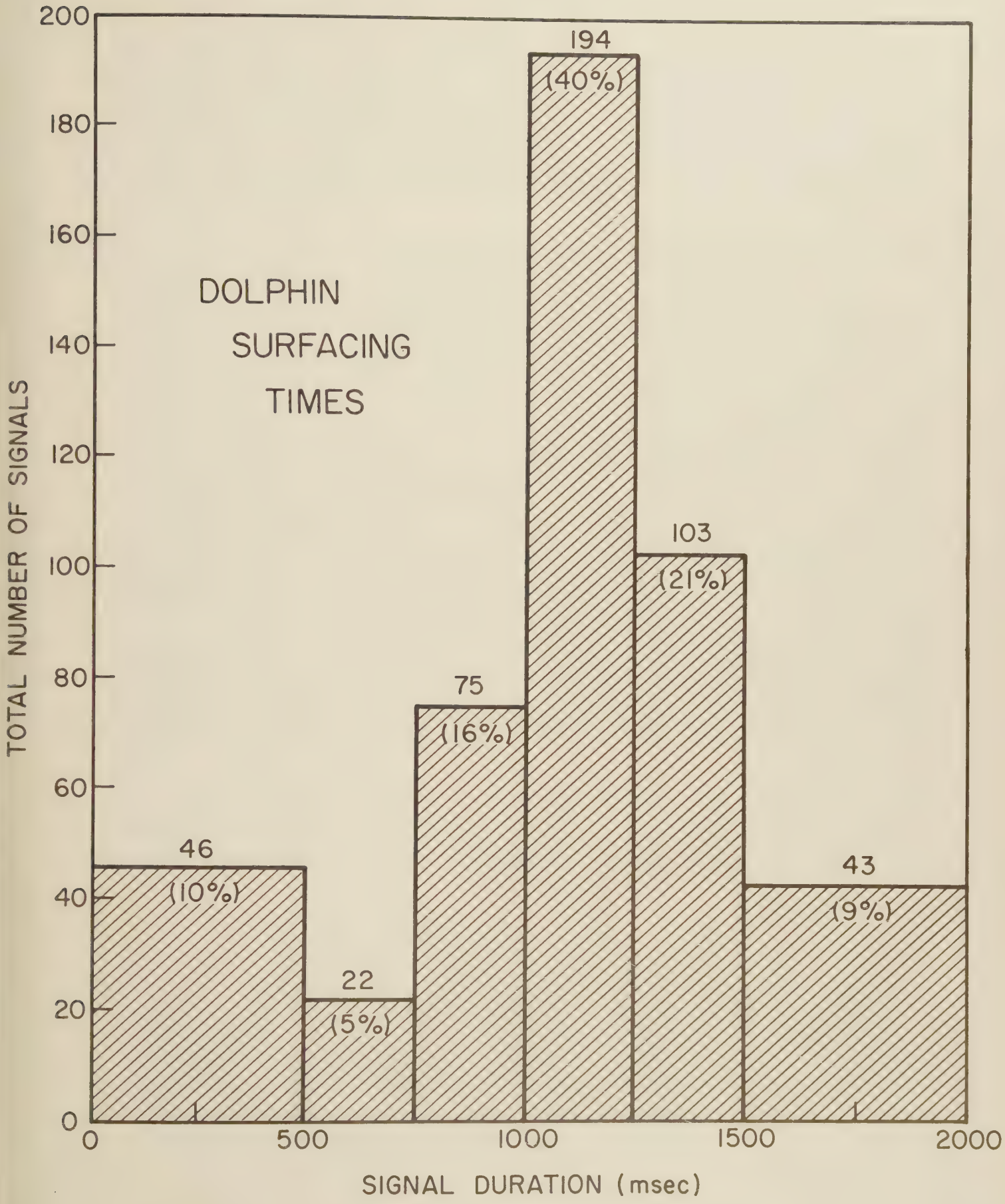
DOLPHIN
SURFACING
TIMES
TOTAL NUMBER OF SIGNALS
SIGNAL DURATION (msec)
0
20
40
60
80
100
120
140
160
180
200
0
500
1000
1500
2000
46
(10%)
22
(5%)
75
(16%)
194
(40%)
103
(21%)
43
(9%)

TABLE 1

Existing data concerning the behavior of Delphinus delphis (common dolphin) are being compiled for analysis. All observed tuna/porpoise sets involving those species will be examined. Common dolphin and streaker mortality accounted for about 26% of total incidental dolphin mortality in 1979. Although fleet performance has greatly reduced incidental spotted dolphin mortality rates, common dolphin and streaker mortality rates continue relatively unchanged.

Two SWFC Divers Receive NOAA Divemaster Certification

During the week of July 21-25, James Coe, Fishery Biologist, and Richard Butler, Fishery Methods and Equipment Specialist, attended a NOAA Diving Office training session covering the use of variable volume dry suits and divemaster responsibilities. The class was held at the Pacific Marine Center on Lake Union in Seattle, Washington, and was attended by seven divemaster candidates. During the third week of training, 6 NOAA operational diver candidates performed a broad range of underwater activities. Guided by the instructors, the operational divers simulated a series of diving accidents and emergencies without the prior knowledge of the divemasters. This method taught the divemasters effective diving accident management in very realistic circumstances. After each simulated emergency, the actions of the divemaster were reviewed by the instructors and the non-participating divemasters. The evening hours were spent in lectures reviewing dive organization, diver selection, first aid, diving accident signs and symptoms, and emergency evacuation methods.

In completing this instruction, Coe and Butler join David Holts, SWFC Unit Diving Officer, as NOAA certified divemasters. Three of the five active NOAA divers at SWFC have completed this training in anticipation of rotating diving assignments aboard tuna purse seiners in the eastern tropical Pacific to study net dynamics for porpoise mortality reduction.

TIBURON LABORATORY

FISH COMMUNITIES INVESTIGATION

Investigation Members Participate in Research Cruise Aboard Freeman

Dr. William H. Lenarz, Leader of the Rockfish Analysis Task, Daniel Howard, Frank Jacques, and Susan Smith of the Predator-Prey Task, and Daniel Ralph of the Fishery Development Task, participated in a research cruise aboard the NOAA vessel Miller Freeman. The cruise took place July 13-26, 1980, between Santa Cruz and Point St. George, California. The principal objectives of the daytime portion of the cruise were to use hydro-acoustics and mid-water trawling to estimate the biomass of Pacific whiting and shortbelly rockfish. If a heavy fishery develops for shortbelly rockfish and intensive management is required, it appears feasible to use hydro-acoustics to estimate relative abundance of shortbelly rockfish off central California with about a week of ship time. An important question regarding an estimate is whether a constant portion of the stock is vulnerable to acoustical sampling.

At night the scientists studied the distribution and feeding behavior of shortbelly rockfish and their predators. In daylight the shortbelly tended to form discrete schools close to the bottom, but at night the fish tended to disperse from these schools and form a continuous layer somewhat higher in the water column. Stomach samples were collected for food analysis from shortbelly rockfish and from other species large enough to be potential predators. Thirteen hauls were made with a Tucker trawl to sample potential shortbelly prey. While laboratory analysis of the material has just begun, stomach contents indicated that euphausiids were an important prey for shortbelly rockfish, and that shortbelly rockfish contributed significantly to the diet of Pacific whiting.

In addition to the biomass estimates and ecological studies, about one ton of shortbelly rockfish was frozen for market tests by the staff of the Fishery Development Task, and specimens of "species" were collected for analyses by the staff of the Physiological Ecology Investigation and other scientists.

Seasonal Trend Noted in Diet of King Salmon

To understand better the effect of predators on commercially harvested fish stocks, Fishery Biologists Peter Adams and John Berge of the Predator-Prey Task are investigating feeding of the king salmon (Oncorhynchus tshawytscha) and silver salmon (O. kisutch), to determine how these important commercial and recreational species affect populations of juvenile rockfishes. Samples have been taken from commercial partyboats operating out of the San Francisco Bay area, and sufficient numbers of stomachs from king salmon have been examined for a preliminary analysis.

The diet of king salmon has a seasonal trend. In May the king salmon were eating small crustaceans almost exclusively--primarily the euphausiids, Thysanoessa spinifera, and the megalops stage of Cancer sp. In June the diet is dominated by juvenile rockfishes, with the euphausiid T. spinifera still an important component. By July the king salmon is primarily piscivorous and the Northern anchovy (Engraulis mordax) makes up the major portion of the diet. There was no significant difference in lengths of fish caught in the different months. It is too early to determine how seasonal shifts in fishing location affect this seasonal diet pattern.

FISHERIES DEVELOPMENT INVESTIGATION

Groundfish Management Plan Tentatively Approved by Pacific Fishery Management Council

Edward Ueber, Co-chairman of the Groundfish Plan Development Team of the Pacific Fishery Management Council, reports that most of the Plan has been tentatively approved by the Council. Still to be resolved are trip limits and quotas for Pacific Ocean perch. In September the Team will meet in Washington, D.C. with NMFS Management Division personnel, as well as NOAA and DOC officials to discuss the Groundfish Plan.

Local Fisheries Development Activities

About a ton of shortbelly rockfish was collected by Daniel Ralph aboard the NOAA vessel Miller Freeman. The sample, frozen in 30-pound cartons, will be shipped to Japan by a local exporter to evaluate market response. Samples were also provided to a local fish dealer and to the West Coast Fisheries Development Foundation. In other developments, charter bid requests are being solicited from owners of commercial trawlers. Scientists hope to catch shortbelly rockfish to research various potential markets, both in the United States and abroad, and plan to experiment with a new trawl to learn if it is more economical than a mid-water trawl.

Lieutenant Patrick Rutten (NOAA Corps) and Bruce Wyatt (Sea Grant Marine Advisor) caught rock crabs at Point Reyes, California, and gave samples to a fish market for trial sales in Santa Rosa. Experiments are being conducted at that market on maintaining the crabs for live sale. Lieutenant Rutten also completed construction of experimental octopus traps. He will work with a fisherman at Point Arena, California, to learn if octopus can be harvested economically.

Pen-reared Salmon Provide Good Fishing

Tagged king salmon reared and released in 1978 at this laboratory are being recaptured mostly by recreational anglers in the San Francisco Bay region. Thus, one of the chief objectives of the project--to provide

more salmon for sport fishermen in the Bay area--seems to have been fulfilled. Over 1% of tagged fish has already been recovered (to June 13, 1980), and the grand total should indicate a return rate well in excess of 10 percent. The Tyee Club, a sport fishing group cooperating in this project, has decided to continue the program this year. The Tiburon Laboratory will provide the facilities and act as advisors.

PHYSIOLOGICAL ECOLOGY INVESTIGATION

Work Progresses on Manuscripts Discussing Striped Bass Eggs and Larvae

Work continues on manuscripts which describe results of laboratory experiments with striped bass eggs and larvae. The paper entitled "Effects of food and feeding factors on laboratory-reared striped bass larvae," by M. B. Eldridge, J. A. Whipple, D. Eng, M. J. Bowers, and B. M. Jarvis has been accepted for publication in Transactions of the American Fisheries Society. It presents how food concentration and feeding behavior are related to larval survival, point of no return, development and some energetic parameters. Food availability and the energy rich oil globule of the larvae were found to affect larval growth and survival the most.

The manuscript "Bioenergetics and growth of striped bass embryos and larvae," by M. B. Eldridge, J. A. Whipple, and M. J. Bowers is in outside review. Energetic processes of input and output energy flows through $Q_I = Q_W + Q_G + Q_M$ where

Q_I = input energies whether endogenous, exogenous or a combination of the two.

Q_W = waste energy.

Q_G = growth energy.

Q_M = metabolic energy.

Each component of the equation was partitioned and examined in detail, and the efficiencies of the energy utilization determined. Results of this research allowed the estimation of the food needs of laboratory-reared larvae, and these were compared to estimated daily rations of wild fish.

Dr. Jeannette A. Whipple and Rachel Fischer completed rewriting and editing the manuscript entitled "An ecological perspective of the effects of monocyclic aromatic hydrocarbons on fishes," by J. A. Whipple, M. B. Eldridge, and P. Benville, Jr. The manuscript was re-submitted for publication in Biological Monitoring of Marine Pollutants, edited by F. J. Vernberg, A. Calabrese, F. P. Thurberg, and W. B. Vernberg.

PACIFIC ENVIRONMENTAL GROUP

AN OVERVIEW OF OCEAN CLIMATOLOGY MONITORING

Nationally Coordinated XBT Monitoring Program Emerges

A method to monitor marine meteorological conditions from ships of opportunity (primarily merchant vessels) has been in operation for decades. Under World Meteorological Organization sponsorship, ships at sea make weather observations every 6 hours. The data are then transmitted to receiving stations and forwarded to meteorological organizations where they are merged with land-based observations. These data are the basis for hemispheric and global weather maps showing high and low pressure distributions, location of weather fronts, etc. During the last 10 years these data have also become the basis for computer model weather forecasts.

There is no equivalent system to monitor or forecast ocean variability. However, development of the expendable bathythermograph (XBT) that can be launched from merchant vessels without interference to ship operation, provides an opportunity to do for the ocean what has been done for the atmosphere. The Navy seized the XBT opportunity and instrumented merchant vessels to obtain XBT thermal profiles. The data are transmitted to receiving stations in coded form very much like weather data. Under the co-sponsorship of the Navy and the NSF, the NMFS (PEG) has maintained an XBT section between California and Hawaii for 14 years. A transequatorial section from California to Samoa has been added in recent years. As part of IDOE/NORPAX, a trans-Pacific XBT monitoring program (TRANSPAC) was begun 5 years ago by the Scripps Institution of Oceanography (SIO). More recently SIO, in participation with ORSTOM in New Caledonia, has begun XBT monitoring of the tropical Pacific. All of these projects use regularly scheduled merchant vessels to launch the XBT probes.

Vertical temperature sections, such as those obtained from California to Hawaii provide an excellent data base for monitoring ocean variability. These sections have limitations, however, as time series are provided only in two dimensions. A three dimensional time series would be more useful. Investigators at SIO, using TRANSPAC data, have achieved this more useful objective by mapping temperature anomalies every month at the surface and at several levels down to 500 m. An advantage of the mapping procedure is that all data can be merged, including those from incidental XBT launchings from research, Navy, or even fishing vessels. The anomaly maps are used by researchers at the Naval Postgraduate School to develop a dynamic model of the North Pacific. Thus, oceanographers are catching up with common practice in meteorology.

With the development of mapping procedures and routine monitoring, the research funding organizations NSF and ONR are withdrawing support for routine monitoring, which is the responsibility of operational units of the government. The Navy and NOAA will assume this responsibility and coordinate all XBT monitoring.

The Navy has had a longstanding interest in the thermal structure of the upper ocean. More recently, as a result of the National Climate Program Act, NOAA has become interested in this information and wants to establish a time series data base for climate studies. The NMFS also has had a longstanding interest in ocean temperatures and the new developments should be of great interest, as fish communities are materially affected by temperature distributions not only at the surface but also below the surface.

Under a NOAA/NAVY Agreement, the Navy will assume responsibility for the needed equipment and XBT probes, and NOAA will assume the ship liaison and operational responsibilities. While NOAA's contribution is in the budget process and the operational framework is under organization, an interim arrangement during FY81 will monitor XBT. Under this arrangement the Navy's Fleet Numerical Oceanography Center (FNOC) will assume responsibility for equipment maintenance and supply XBT probes. NOAA's National Climate Program Office will fund the ship liaison and operational aspects. Because the SIO has been deeply involved in much of the ship of opportunity liaison and operations, this funding will be used to continue, under contract, the SIO involvement during FY81. PEG, because of its own XBT work and because it is collocated with FNOC, has been asked by the National Climate Program Office to monitor the contract with SIO. Under this contract which is now being negotiated, the SIO, operating from space provided by the Tiburon Laboratory, will maintain its TRANSPAC operations. In addition the SIO will assume ship liaison for the PEG California to Hawaii and transequatorial XBT sections, as well as service the ships of the Navy's caps program. One or two SIO employees stationed at Tiburon will meet merchant vessels that come to San Francisco Bay, supply the ships with probes, check recorders and launchers, and collect the XBT recordings. The SIO program manager at La Jolla will maintain "good will" liaison with domestic and foreign shipping companies as well as with the U.S. Maritime Administration and the U.S. Merchant Marine Academy whose cadets often do the work at sea.

Participating vessels will continue to transmit XBT messages through established channels to FNOC. At each call in San Francisco Bay the XBT traces will be collected for digitizing and archiving by FNOC. Along with other data files at FNOC, PEG will be able to extract temperature data from the XBT file for fishery applications.

The NOAA/NAVY Agreement covers XBT monitoring from regularly scheduled merchant vessels. Research vessels will continue to do XBT sampling and to transmit XBT messages. There are hopes that fishing vessels will also participate in collecting and transmitting XBT data. These non-scheduled observations, when merged with those from merchant vessels, can help to materially improve the quality of the temperature anomaly maps.

In the June Monthly Report the names of the NOAA Junior Fellows appeared underneath the wrong photos. The photos with the correct names are reprinted below.

F. Jacques

R. Kiy

HONORS AND AWARDS

Honolulu laboratory

July 28 - Assistant Center Director John Carr presented awards to the following:

Donald C. Aasted	Special Achievement
Jeri M. Davis	15-year Service Pin
Alice-May Drury	Superior Performance
Bernard M. Ito	Special Act
Walter M. Matsumoto	Special Achievement
Tamotsu Nakamura	Superior Performance
Tamotsu Nakata	Superior Performance
Jeffrey J. Polovina	Superior Performance

Paul M. Shiota	Special Achievement
Irene H. Toyomura	Superior Performance
Richard N. Uchida	Superior Performance
Howard O. Yoshida	Superior Performance
Elizabeth F. Y. Young	Superior Performance
Carol A. Yukihiro	Superior Performance

La Jolla Laboratory

July 11 - An awards ceremony was held at the Center and Director Izadore Barrett presented many staff members with certificates and with cash awards. The recipients who appear in the photograph are:

(front row, left to right)	
John Brown	Group Cash Award
Carol Kimbrell	Group Cash Award
Daisy Gaston	Cash Award
John Henderson	Cash Award
Ken Bliss	Cash Award
Kate Coleman	Cash Award
Elaine Sandknop	Group Cash Award
John Butler	Group Cash Award
(2d row, left to right)	
Izadore Barrett, Director	
Tom Shay	Quality Step Increase, Outstanding Performance Rating
Dick Butler	Quality Step Increase, Outstanding Performance Rating
Mike Laurs	Cash Award
Larry Ebert	Cash Award
Bruce Wahlen	Outstanding Performance Rating

Those who received awards but do not appear in the photograph include:

John Carr	Cash Award
James Coe	Outstanding Performance Rating and Quality Step Increase
Dan Gittings	Cash Award
Barbara Sumida MacCall	Group Cash Award
Geoff Moser	Group Cash Award
Albert Myrick	Cash Award
Bob Nishimoto	Cash Award
William Perrin	Cash Award
Gary Sakagawa	Cash Award
Paul E. Smith	Cash Award
Tim Smith	Cash Award
Gary Stauffer	Cash Award
Betsy Stevens	Group Cash Award
Ray Stives	Cash Award
Warren Stuntz	Cash Award
Frances Tonsich	Quality Step Increase
Lillian Vlymen	Quality Step Increase

Tiburon Laboratory

July 10	Catherine J. Hurst	Sustained Superior Performance

SEMINARS

Honolulu Laboratory

July 22-24 - Dr. Bruce Phillips, CSIRO, showed a movie and spoke on "The western rock lobster, Panulirus longipes, in Australia."

La Jolla Laboratory

July 31 - Margaret Budd from Work Unlimited presented an EEO seminar entitled Word Power...The Use of Sexist Terminology in language.

Tiburon Laboratory

July 28 - A seminar with San Francisco State University/Tiburon Laboratory was held at the Tiburon Center for Environmental Studies (San Francisco State University). The seminar was presented by Dr. Victor Smetacek, Senior Research Associate, University of Kiel, West Germany. The seminar topic was entitled Unraveling Pelagic Processes: Field Studies and Enclosure Experiments in the Baltic Sea.

PUBLIC AFFAIRS

Honolulu Laboratory

July 31 - The Honolulu Laboratory, Pacific Marine Center, and the University of Hawaii Sea Grant Marine Advisory Program combined efforts in staging an Open House on the Townsend Cromwell in Hilo, Hawaii, on July 31. P. Shiota and Illustrator Tamotsu Nakata were primarily responsible for the exhibits.

La Jolla Laboratory

June 21 - Sea World Explorer Scouts visited the Southwest Fisheries Center. They saw a slide show concerning the history and functions of the Center, and were given a tour of the laboratories by Michele Winkler, Technical Writer.

Tiburon Laboratory

July 4 - Mickey Eldridge represented the Southwest Fisheries Center at the NOAA Open House aboard the MacArthur in Oakland, California.

PRESS RELEASES

July 3 - "Skipjack Tuna Spawn in Captivity"

14 - "Richard Kiy Awarded NOAA Junior Fellowship"

14 - "Frank Jacques Selected as First Tiburon NOAA Junior Fellow"

VISITORS

Honolulu Laboratory

July 8 - R. Shomura was visited by Dr. Jack Davidson, Director, Sea Grant Programs, University of Hawaii, and Jim Sullivan, Sea Grant College, University of California, La Jolla, CA 92093.

10 - Stuart Hill, Systems Architects, Inc., conducted interviews for SWFC 5-year computer requirements study and also met with Shomura and G. Liao.

11 - Paul D. Renard, Renard Assoc., Inc., 311 S. Edgewood St., Arlington, VA 22204, conducted the Systems 1022 training course in the Honolulu Laboratory conference room, July 7-11.

14 - Drs. Nancy Withers, J. Davidson, and Philip Helfrich of the University of Hawaii discussed ciguatera research with Shomura and R. Uchida.

18 - Dr. Bruce Phillips of CSIRO, Australia, met with Shomura. Dr. Phillips will be interacting with the Insular Ecosystem personnel on spiny lobster-related research for about 3 weeks.

21 - Charles Salmon, U.S. State Department, who was enroute to his next post in the U.S. Embassy in New Zealand, met with Shomura and Doyle E. Gates.

- Craig Harrison, U.S. Fish and Wildlife Service, discussed a possible cooperative project on seabird/tuna schools interaction with Shomura.

22 - Fred Kellenberger of La Jolla was at the Honolulu Laboratory; he spent most of his time with Liao.

24 - Dr. Robert A. Skillman spent some time with Shomura. After a short vacation in Honolulu, Skillman returns to the South China Sea Programme in Manila, Philippines.

La Jolla Laboratory

July 7 - Stuart Hill, Fairfax, Virginia

8 - Dr. Richard A. Hamilton, Director of the Motivators, a firm specializing in Human Relations and Communications problems, located in San Diego, California.

8 - Ronald J. Nachmer, Stanford University, Chemistry Department

15 - Richard L. Dixon, Dan Gotschall, Kristine Henderson of California Fish and Game, Long Beach, California

16 - James and Sally Larsen, Lompoc, California

16 - Maria Harmsen, Fisheries Research Biologist from the Instituto Nacionel de Pesca, Guayaquil, Ecuador, is here for training in larval fish identification. Signora Harmsen will spend the next six months working with Dr. G. Moser and his staff.

July 23 - Three fisheries biologists from the Romanian Institute of Marine Researches, Constantza, Romania - Dr. Sc. Geza Julius Muller, principal senior scientist of biological oceanography; Contraamiral inginer Tomescu Constantin, Director; and Dr. Marian-Traian Gomoiu, Senior scientist of marine biology, visited the Southwest Fisheries Center to discuss the study of spratt, anchovy and mackerel with Drs. P. Smith and R. Lasker.

24 - Floyd Anders, Deputy Director, Southwest Region

Tiburon Laboratory

July 1 - Mel Komagnesia, Products Unlimited, Santa Rosa, CA

2 - Izadore Barrett, Southwest Fisheries Center, La Jolla, CA

- John Carr, Southwest Fisheries Center, La Jolla, CA

- David Mackett, Southwest Fisheries Center, La Jolla, CA

- Ben Remington, Southwest Fisheries Center, La Jolla, CA

7 - Michael Watson, Environmental Protection Agency, Seattle, WA

8 - G. W. Bowes, State Water Resources Control Board, Sacramento, CA

- Dr. Donald G. Crosby, Department of Environmental Toxicology, University of California, Davis, CA

10 - Tony Davoren, Tiburon, CA

11 - R. Bruce MacFarlane, Department of Oceanography, Florida State University, Tallahassee, FL

14 - Michael DeManche, University of Southern California, Hancock Foundation, Los Angeles, CA

- Bruce Wyatt, University of California, Sea Grant, Santa Rosa, CA

15 - Tom Wilson, Pacific Gas and Electric Company, Avila Beach, CA

- Katie Wright, Pacific Gas and Electric Company, Avila Beach, CA

17 - John Dronkers, General Services Administration, San Francisco, CA

- Dr. Fred D. Oremland, Kentfield, CA

21 - Morgan J. Griffiths, San Francisco State University, San Francisco, CA

- Paula McLaughlin, Golden Rule Capital Corporation, Tiburon, CA

- Mike P. Storer, San Francisco, CA

25 - Ronald Kamerlink, Hitachi, Mountain View, CA

- Dave Roskelley, Barbary Coast Sea Food, Sebastopol, CA

28 - Barbara Thompson, Ross Valley Reporter, San Anselmo, CA

Pacific Environmental group

July 1 - I. Barrett, D. Mackett, J. Carr, B. Remington, SWFC, La Jolla, CA

10 - R. Bruce MacFarlane, Dept of Oceanography, Florida State University, Tallahassee, FL

23 - Nelson Ross, NOAA, EDIS, La Jolla, CA

25 - Dr. Gary Sharp, FAO, Rome, Italy

MEETINGS AND TRAVEL

Honolulu Laboratory

July 28 - Messrs. John Carr and Ben Remington of the Southwest Fisheries Center reviewed FY81 tasks and budget with Richard S. Shomura and Task Leaders.

July 28-August 1 - R. Shomura R. Uchida, W. Gilmartin, Howard O. Yoshida, and Roy Mendelssohn traveled to Hilo, Hawaii to participate in the Scientific and Statistical Committee and Western Pacific Regional Fishery Management Council meetings.

La Jolla Laboratory

June 22-30 - A. Coan traveled to Mayaguez, Puerto Rico, to review the tuna sampling program.

June 24-July 11- Dr. W. Perrin traveled to Cambridge, England, to chair a meeting of the International Whaling Commission's Small Cetaceans Sub-committee, as part of the annual meeting of the Scientific Committee of the IWC.

July 1-2 - Director Barrett, accompanied by Carr, Mackett and Remington traveled to Monterey and Tiburon to conduct Center Task Reviews.

7-8 - F. Kellenberger was in Los Angeles to attend the Pacific Marine Fisheries Commission's Data Goals Committee meeting.

7-8 - Director Barrett attended the Pacific Fishery Management Council's Scientific and Statistical Committee meeting in the Southwest Fisheries Center's Auditorium.

8 - D. Mackett traveled to Los Angeles to attend the State/Federal meeting and discuss strategic planning with the staff of the Southwest Region.

9 - Barrett, Deputy Director John Carr, Program and Planning Officer David Mackett, and Executive Officer Ben Remington conducted Program Reviews of the Coastal Fisheries Resources Division.

9 - Barrett and Carr attended a meeting regarding details of future operation of Commerce-licensed radio station WWD.

9-11 - Computer Specialists C. Oliver and F. Ralston were in Los Angeles to attend a course at UCLA on bio-medical computer programing.

11 - A review of the Administrative and Automatic Data Processing Programs at the Southwest Fisheries Center was conducted. F. Kellenberger, Data Systems Manager was present, in addition to Barrett, Carr, Mackett and Remington.

13-18 - Dr. G. Moser traveled to Mexico City to train Mexican scientists in the identification of fish eggs and larvae.

14 - A program review of the Coastal Fisheries Resources Division's tuna program was conducted by Barrett, et al.

14-15 - Barrett, with the assistance of Carr, Mackett and Remington conducted a review of the Oceanic Fisheries Resources Division's Marine Mammal Program. Division Leader G. Sakagawa and other staff members were present.

14-20 - J. Squire, Fishery Biologist, traveled to major sport fishing locations in Mexico to contact resort managers regarding tagging of billfish, present the Gardiner Foundation Awards to the boat skippers and cooperating fishing resorts, and distribute tagging equipment and angler survey forms.

15 Meeting of the Ad Hoc Acoustics Committee to discuss ways and means of transferring priority items to the control of the NOAA ship, Jordan. Commander J. A. Sowers, Chief of Electronic Engineering Branch, Pacific Marine Center, participated in the discussions attended by Carr and others from the Center.

15-17 - Dr. M. Laurs was in Newport, Oregon, to consult with fishermen concerning satellite data distribution systems and help troubleshoot difficulties in copying WWD broadcasts.

16 - Computer programmer Bob Butler was in San Francisco to demonstrate the PACES computer system to Coast Guard members.

20-26 - J. Coe, Fishery Biologist, and Dick Butler, Gear Specialist, traveled to Seattle to attend a NOAA Divemaster training course.

21-23 - Barrett and Dr. Reuben Lasker traveled to Pine Valley, California to attend a CalCOFI retreat.

21-26 - F. Kellenberger traveled to Honolulu to meet with the staff of the Honolulu Laboratory, Western Pacific Program Office and the Hawaii Department of Fish and Game on ADP activities.

22-23 - L. Vlymen and D. Gittings were in Pasadena to attend a Lockheed computer training seminar on the Dialog Information Retrieval System.

31 - Dr. Lasker attended a Commission of the California Committee Fisheries and Navigation meeting at the Hotel del Coronado.

Tiburon Laboratory

July 2 - A meeting conducted by the Southwest Fisheries Center Director, Izadore Barrett; John Carr; Dave Mackett; and Ben Remington was held at the Tiburon Laboratory. The main purpose of this meeting was to review/discuss the Current Year Task Plans for Fiscal Year 1981 with Norman J. Abramson, Walburga Giguere, Investigation Chiefs, and Task Leaders.

July 7 - Edward Ueber traveled to the Southwest Fisheries Center, La Jolla, to attend a meeting of the Scientific and Statistical Committee of the Pacific Fishery Management Council. He then attended the Council meeting at Los Angeles, California, on July 8-10, representing the Groundfish Planning Team.

7-10 - Daniel Ralph traveled to the Sandy Hook Laboratory, Northeast Fisheries Center, Highlands, New Jersey, to discuss revision of his manuscript on butterfish and plan a joint paper with Laboratory personnel.

13-26 Dr. William H. Lenarz, Daniel Howard, Frank Jacques, and Susan Smith participated in the research cruise aboard the NOAA vessel Miller Freeman. The cruise took place between Santa Cruz and Point St. George, California.

- Daniel Ralph also particpated in the Miller Freeman research cruise. In addition to aiding in the cruise objectives, Mr. Ralph collected shortbelly rockfish for market development, and studied euphausiid distribution.

14 - Norman J. Abramson met at the Tiburon Laboratory with Curtiss Davis (Tiburon Center for Environmental Studies), Herb Curl (Pacific Environmental Marine Laboratory, Seattle, Washington), and Michael DeManche (University of Southern California, Los Angeles), to discuss the possibility of Mr. DeManche conducting research at the Tiburon Center for Environmental Studies, and research duration on effects of low-level chronic hydrocarbon pollutants on phytoplankton and zooplankton communities.

21 - Norman J. Abramson and Walburga Giguere met at the Tiburon Laboratory with Morgan Griffiths, San Francisco State University, to discuss plans for the base sewage disposal system.

21-29 - Dr. Edmund S. Hobson and James R. Chess traveled to Sitka, Alaska, to investigate community structure in nearshore communities along the western shore of Baranof Island.

23 - Edward Ueber traveled to Menlo Park, California, to work on the Groundfish Management Plan in the California Department of Fish and Game Office.

25-26 - Lieutenant Patrick Rutten traveled to Eureka, California, to meet the NOAA vessel Miller Freeman. He arranged for storage and transportation of samples of shortbelly rockfish, and transported gear and personnel back to Tiburon.

25 - Tina Echeverria traveled to Fort Bragg, California, to pick up rockfish samples. At Eureka, California, she picked up members of our Laboratory staff who participated in the Miller Freeman cruise and returned them to Tiburon.

30 - The first of a series of instructional meetings on fish histopathology was attended by striped bass researchers representing four different Government agencies. Mickey Eldridge, Michael Bowers, Brian Jarvis, and Karen Taberski went from the National Marine Fisheries Service, Tiburon Laboratory. The session was headed by Dr. Sefton R. Wellings, Department of Pathology, University of California, School of Medicine, Davis, California.

PERSONNEL

Honolulu Laboratory

July 3 - Sharon D. Hendrix, Biological Aid (Fisheries) - Completion of temporary appointment.

26 - Christine E. Siu, Biological Aid (Microbiology) - Completion of temporary appointment.

La Jolla Laboratory

June 16 - Michael W. Newcomer, Biological Technician - Extension of appointment

July 12 - James M. Cotton, Biological Technician - End of assignment

- Gary L. Friedrichsen, Biological Technician - End of assignment

17 - Jon Peterson, Biological Technician - End of assignment

25 - Kathleen A. Coleman, Secretary - resignation

27 - Richard Charter, Computer Specialist - Promotion

27 - Carol A. Kimbrell, Fisheries Biologist - Promotion

28 - Susan M. Pollock, Biological Aid - Temporary appointment

- Michael P. Storer, Biological Aid - Temporary appointment

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